PLASMA TREATMENT OF TEXTILE FIBRES

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Glow-discharge (plasma) technology as well as corona technology both creating a low-temperature plasma, the first one at low pressure and the second one at ambient pressure, are well-established in many areas of industry. They are being explored for application in textile industry, however, only since recently. Thus, the glow-discharge process and the corona process are applied to cellulose fibres to remove sizes and to increase the kinetics of dyeing and the uptake of dye. Both processes are applied to synthetic fibres as well in order to modify their surfaces to achieve a more hydrophilic or hydrophobic character, to enhance fibre matrix adhesion in composite materials, and to apply barriers to fibre surfaces.

Last not least, corona treatment has been applied successfully to wool in the form of top which in conjunction with a suitable resin application results in a shrink-resist effect which is in the range of that obtained by the chlorine/Hercosett process which presents the state of the art. Moreover, however, the corona treatment modifies the surface of the wool fibre in such a way that the diffusion barrier which results from the surface lipid layer (F-Layer) and the highly crosslinked exocuticle is significantly reduced. Thus, the kinetics of dyeing and the dye uptake is increased and hence the residual dye in the effluent is reduced. This is of particular importance for metal complex dyes as well as for after chromium dyes.

Thus, plasma technology has been achieving increased attention and appreciation in textile industry and an industrial process on the basis of top treatment is just being established.